

**Non-calculator Questions**

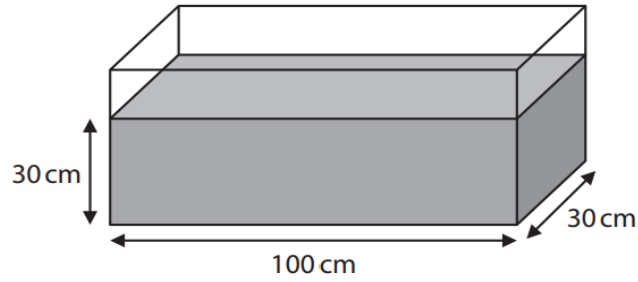
Edexcel

1.

Matt buys a new fish tank.

The fish tank is in the shape of a cuboid.

The diagram shows water in the tank.



Matt knows

$$1000 \text{ cm}^3 = 1 \text{ litre}$$

$$1 \text{ gallons} = 4.5 \text{ litres}$$

He can keep 2 small fish in the tank for every 1 gallon of water in the tank.

Matt thinks he can keep more than 36 small fish in the tank.

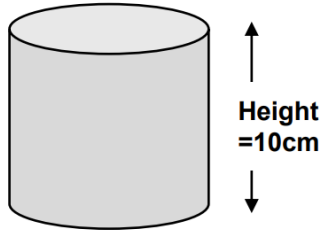
Is Matt correct?

(6)

City & Guilds

2.

The radius of the top of this cylinder is **7cm**



Use  
 $\pi = \frac{22}{7}$

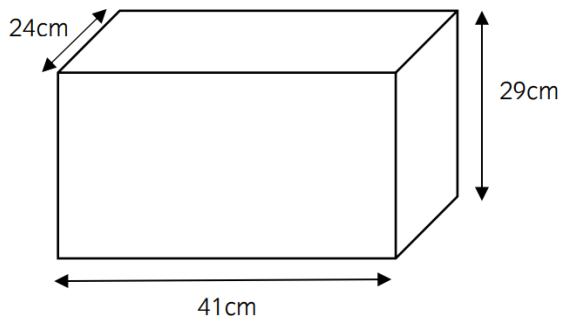
What is the volume of the cylinder?

\_\_\_\_\_ cm<sup>3</sup>

(1 mark)

3.

A man has a fish tank with the following dimensions:



He needs to know approximate volume of the tank.

What is its approximate volume?

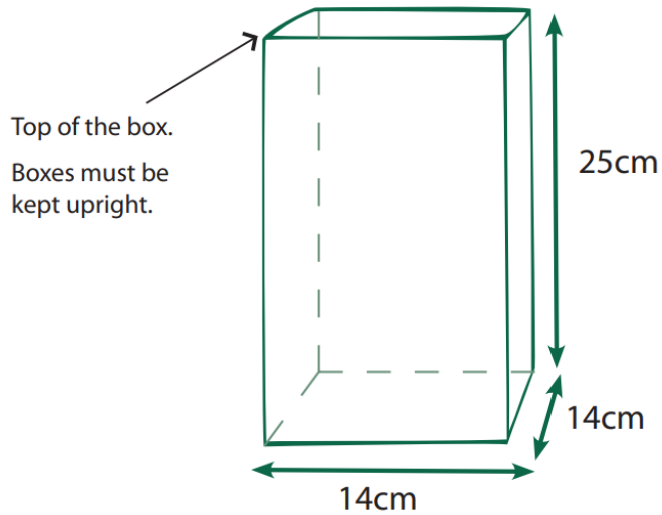
\_\_\_\_\_ cm<sup>3</sup>

(2 marks)

Highfield

4.

The bank is ordering more leaflets. Leaflets are packaged in boxes like this:



The boxes are to be stored in a cupboard. The base of the cupboard is 1.2m x 0.6m and it is 0.8m in height.

**What is the maximum number of boxes that can be stored in the cupboard?**

Show your working out and write the answer in the box below.

*(4 marks)*

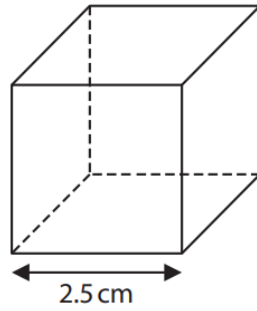
Answer: \_\_\_\_\_

**Calculator Questions**

Edexcel

1.

Here is a cube of side length 2.5 cm.



Work out the surface area of this cube.

(3)

cm<sup>2</sup>

2.

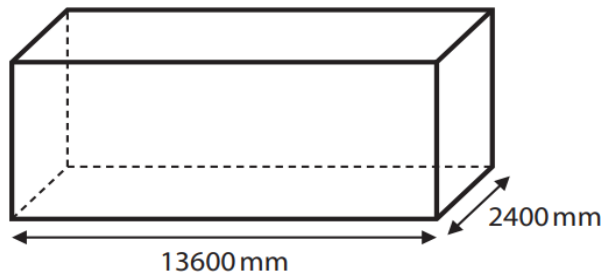
A team of workers deliver identical fridges.

The team will use the average time to fully load an old lorry to predict the time to fully load a new lorry.

The table shows the times it took to fully load the old lorry with 24 fridges.

<b>Time (mins)</b>	52	60	55	59	54	63	56
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The diagram shows the space available for fridges in the new lorry. The space is in the shape of a cuboid.



Each fridge needs a rectangular floor space 1000 mm by 800 mm.

The team do not stack fridges.

They think it will take less than 90 minutes to fully load the new lorry.

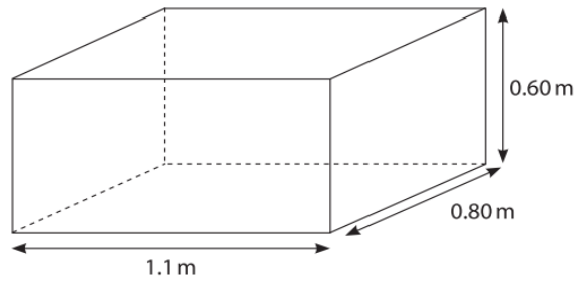
Are they correct?

(6)

3.

James has a contract to paint 30 identical water tanks.  
He has to paint the outside surfaces of each tank, but not the top.

Each surface is rectangular.



James knows that 1 tin of paint

- is enough to cover  $12 \text{ m}^2$  of surface
- costs £26.99

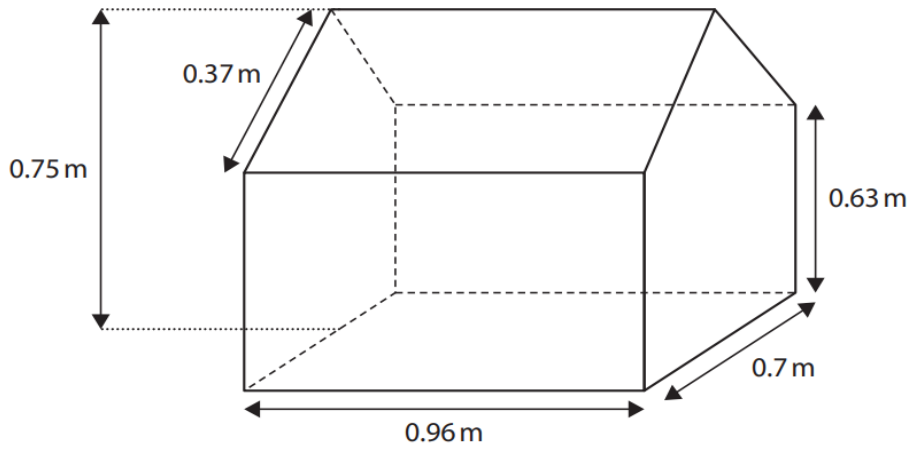
Work out the total cost of the tins of paint he will need for all 30 water tanks.

(6)

£

4.

Here is a diagram of a dolls house Jayden has made.



Two faces are each in the shape of a pentagon with a vertical line of symmetry.

All other faces are rectangular.

The base angles of each pentagon are right angles.

Jayden wants to cover all the surfaces of the dolls house with paint.

He knows the total area of the base and the roof is  $1.3824 \text{ m}^2$

Jayden has enough paint to cover  $3.5 \text{ m}^2$

Has Jayden got enough paint to cover all the surfaces of the dolls house?  
Show why you think this.

(5)

NCFE

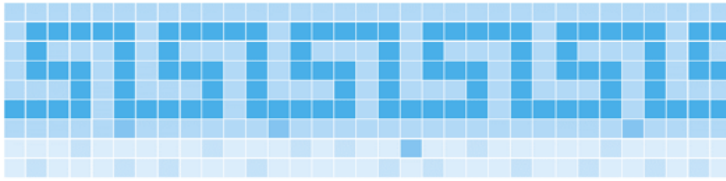
5.

The pool where Asha swims is rectangular.

It is 2500 cm long and 1250 cm wide.

The four sides of the swimming pool are 150 cm deep.

They are covered with small square tiles of different colours.



Each small tile has an area of  $1 \text{ cm}^2$

Asha thinks,

“There must be over a million small tiles covering the sides of this pool!”

Is Asha correct?

Explain how you decide.

**[4 marks]**

Blank area for writing the answer.

Your answer:

Blank box for writing the answer.

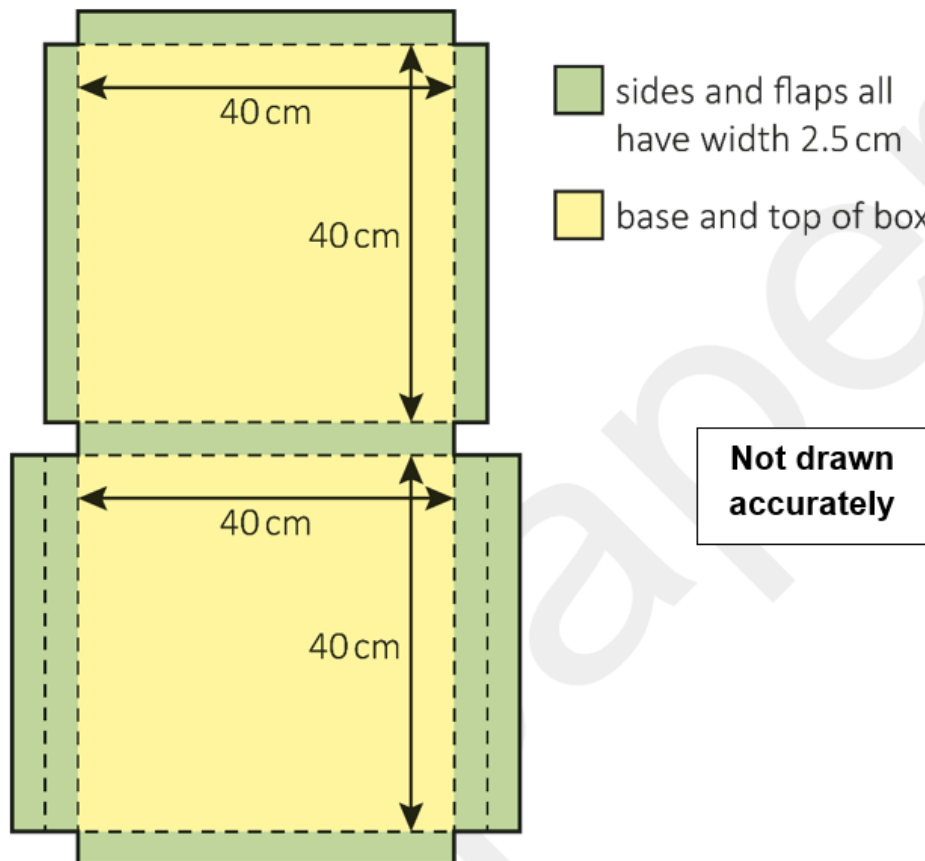


6.

The large pizzas are sold in cardboard boxes.

When closed, the boxes measure 40 cm by 40 cm by 2.5 cm and are cuboid.

This is the net of the pizza box:



The company thinks it could use the same net but reduce the dimensions to 38 cm by 38 cm by 2 cm

Beth is asked to calculate the percentage reduction in cardboard if the smaller boxes are used.

What answer should Beth get?

**[5 marks]**

past paper

Your answer:

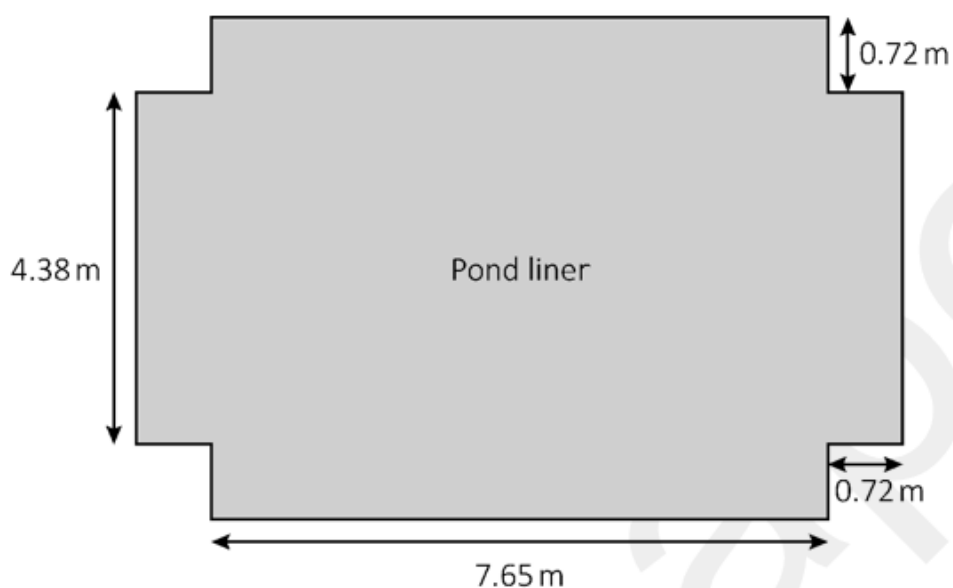
%

7.

The pond will be a cuboid. It will be lined with a sheet of plastic pond liner. The pond liner covers the bottom and sides of the pond.

The pond liner needs to be cut to this shape to exactly fit in to the pond without any overlaps.

The dimensions of the pond liner are shown in this diagram:



Sheets of pond liner are available in these sizes:

Pond liner	Width	Length	Price
A	4.85 m	8.3 m	£76
B	5.45 m	8.7 m	£96
C	5.85 m	9.1 m	£130
D	6.25 m	9.5 m	£151
E	6.65 m	9.9 m	£172

Aria needs to buy the cheapest pond liner that is big enough to fit the pond.

Which pond liner should she buy?

Show your working.

**[3 marks]**



Your answer:



8.

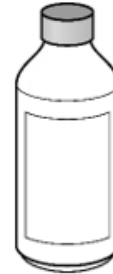
The group ask Aria to buy chemical treatment for the pond water to make it suitable for fish.

One bottle contains enough chemical to treat 1300 gallons of water.

$$1 \text{ m}^3 = 220 \text{ gallons}$$

Aria adds water to the pond until it is 92% full.

How many bottles of chemical treatment will she need?  
Show your working.



**[4 marks]**

Working area for the solution.

Your answer:

**bottles**

9.

Aria needs to work out how many fish can be put in the pond.  
She wants to have both Koi fish and Goldfish.

The number of fish is based on the **surface area** of the water in the pond.

Koi fish need  $1.2 \text{ m}^2$  each.  
Goldfish need  $0.6 \text{ m}^2$  each.

Aria wants to have a mixture of Koi fish and Goldfish in the ratio 1 : 4

What is the maximum number of Koi fish **and** Goldfish that Aria can put in the pond, if she keeps the ratio 1 : 4?

**[3 marks]**

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Your answer:

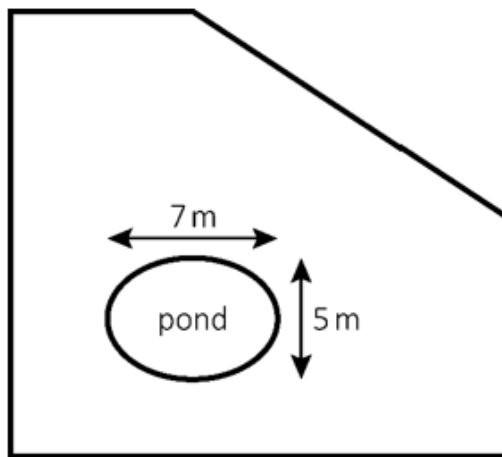
	<b>Koi fish</b>
	<b>Goldfish</b>

10.

There is an oval pond in the allotment.

The pond is 7 m long, 5 m wide and 80 cm deep.

The pond is to be filled in with soil.



Not drawn accurately

The formula to find the volume (in  $\text{m}^3$ ) of the pond is:  $\pi \times \frac{L}{2} \times \frac{W}{2} \times D$

Where:

L is the length (in m)

W is the width (in m)

D is the depth (in m)

Use  $\pi = 3.14$

a)

Soil can be bought in two sizes of bag.

Bag of soil	Volume of soil	Price per bag
A	0.9 m <sup>3</sup>	£74
B	1.5 m <sup>3</sup>	£110

The pond should be filled as cheaply as possible.

How much will it cost? Show your working.

[4 marks]

Your answer:

£



b)

If 3 people work together, it would take them 8 hours to fill in the pond.

How long would it take 5 people working at the same rate?

**[2 marks]**

Your answer:

11.

The cylinder has radius 1.5 m and height 1.25 m

Calculate the volume of the cylinder in  $\text{m}^3$

Give your answer to 1 decimal place.

Use  $\pi = 3.14$

**[2 marks]**

Your answer:

$\text{m}^3$

12.

Jan needs to cover a ball with glitter.



The ball's radius is 60 cm

The formula to find the surface area ( $A$ ) of a sphere is:  $A = 4 \pi r^2$

Jan buys the glitter in bottles.

She needs to use 300 g of glitter per square metre.

Each bottle holds 254 g of glitter.

Calculate the number of bottles of glitter needed to cover the sphere.  
Show your working.

Use  $\pi = 3.14$

**[4 marks]**

Working area for the solution.

Your answer:

**bottles**

City & Guilds

13.

$1\text{m}^3$  is the same as

*(tick one box)*

- A     $100\text{ cm}^3$
- B     $1000\text{ cm}^3$
- C     $100\,000\text{ cm}^3$
- D     $1\,000\,000\text{ cm}^3$

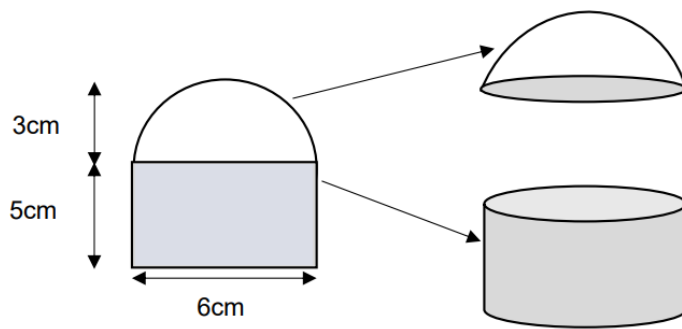
**(1 mark)**

14.

A craftsman uses resin to make a paperweight.

He makes the paper weight from two parts, a hemisphere **and** a cylinder.

He uses this plan.



$$V = \frac{2}{3}\pi r^3$$

$V$  = volume of **hemisphere** in  $\text{cm}^3$   
 $r$  = radius of **hemisphere** in cm  
 $\pi = 3.14$

How much resin does he need for **both** parts?

**Show all your working**

Amount of resin   $\text{cm}^3$

(4 marks)

15.

$$v = \frac{bhl}{2}$$

$v$  = volume in  $\text{cm}^3$   
 $b$  = base in cm  
 $h$  = height in cm  
 $l$  = length in cm

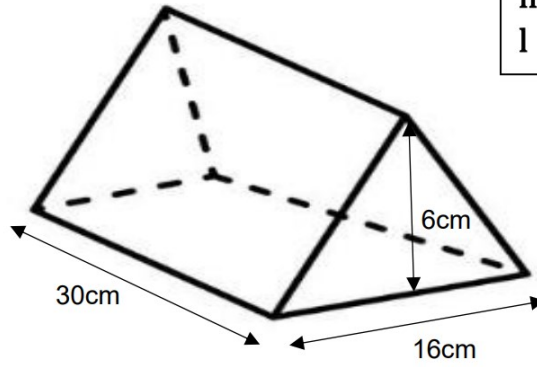


Diagram not to scale

What is the volume of this triangular prism?

$\text{cm}^3$

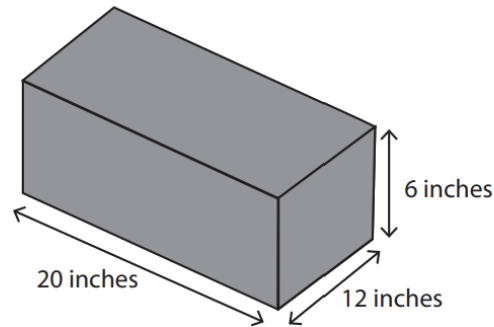
(1 mark)

Highfield

16.

You send the photo frames in boxes, which you cover in paper.

*Diagram not to scale*



**1 inch = 2.54cm**

You need to calculate the surface area of the boxes **in cm** to find out how much paper you need to cover each box.

As you need to include additional paper for the flaps, you use the following formula to calculate the total amount of paper required per box:

$$S \times 0.5\pi = T$$

S = Total surface area

T = Total amount of paper required

$\pi = 3.14$

**What is the total surface area of paper required per box? Give your answer in  $\text{cm}^2$**

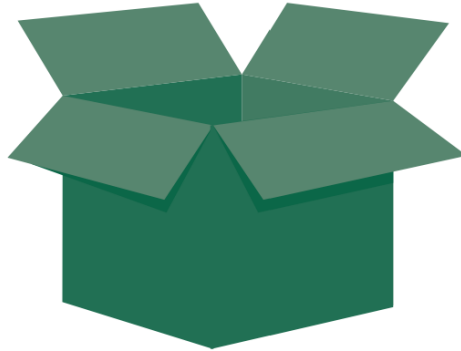
Show your working out and write the answer in the box below.

*(5 marks)*

Answer: \_\_\_\_\_  $\text{cm}^2$

17.

Your manager has asked you to unload some boxes from a delivery and put them in the storage yard.



There are 3 different-sized boxes:

Box	Length	Width	Height	Weight
A	40cm	25cm	1m	2.9kg
B	35cm	30cm	0.8m	3.1kg
C	38cm	28cm	0.9m	2.6kg

a) Which box has the largest volume?

Show your working out and write your answer in the box below.

(4 marks)

Answer: \_\_\_\_\_

b)

The delivery arrives on a pallet which contains 8 boxes (either A, B or C from the table above).

The pallet weighs 5kg.

For deliveries up to 30kg you use a trolley. For deliveries over 30kg you use a forklift.

**b) Using the table above, will you use the trolley or the forklift to unload the delivery?**

Show your working out and write your answer in the box below.

*(2 marks)*

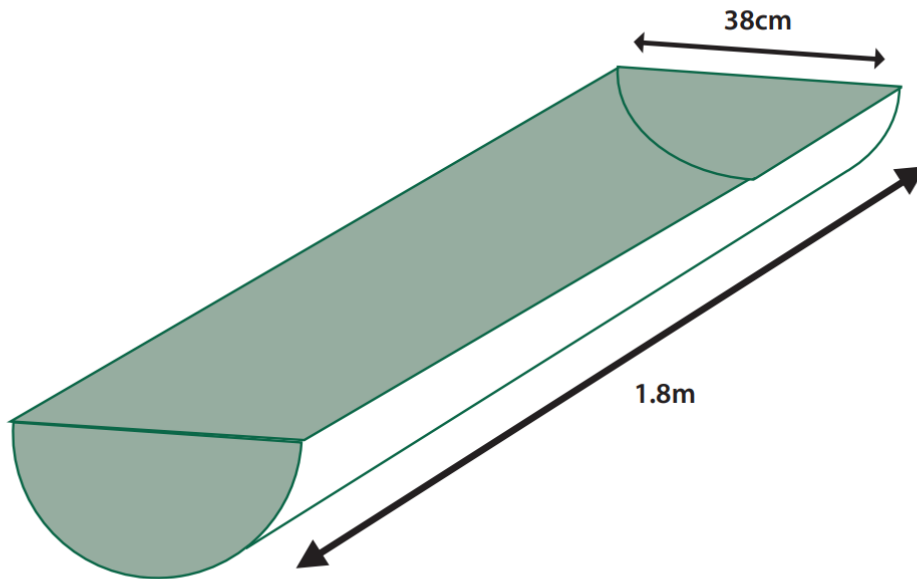
Answer: \_\_\_\_\_



18.

You need to have a total of 1000 litres of water available for your animals.

You use troughs to hold the water.



The ends of the troughs are semi circles.

You use the following formula to calculate the volume of water each trough will hold.

$$V = \frac{(\pi r^2 l)}{2}$$

Where:

$V$  = volume of water in  $\text{cm}^3$

$r$  = radius of cross section in cm

$l$  = length of trough in cm

**Use  $\pi = 3.14$**

**1 litre = 1000 $\text{cm}^3$**

You have estimated that one trough is approximately a fifth of the 1000 litres of water you need.

Level 2 Maths Volume and Surface Area Exam Questions

**Are you correct?**

Show your working out and write the answer in the box below.

*(5 marks)*

Answer: \_\_\_\_\_

Open Awards

19.

Raheema finds that she can be more environmentally friendly by collecting rain water from her drain pipe, so she can use it to water her garden.

Raheema buys a cylindrical container that is 80cm in diameter and 1 metre high.



Raheema thinks the container will hold at least 100 gallons of water. Is she correct?

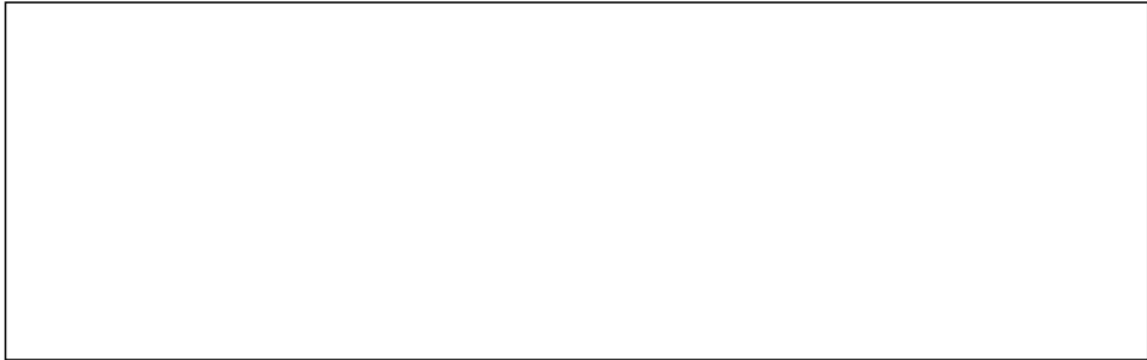
(5 marks)

$\pi = 3.14$

$1\text{m}^3 = 219.97 \text{ gallons}$

Show your calculations and/or workings out here:

Explain your answer in this box.

A large, empty rectangular box with a thin black border, intended for the student to write their explanation.

AQA

20.

Maya runs a company that makes and sells candles.

The mass of wax, in grams, needed to make a candle can be worked out using

$$W = v \times \left( \frac{100 - f}{100} \right) \times 0.83$$

$W$  is the mass of wax, in grams

$v$  is the volume of the candle, in cubic centimetres

$f$  is the percentage of fragrance in the candle

The company makes a candle in the shape of a cylinder.

The candle has radius 4 cm and height 15 cm

The candle has 10% fragrance.

Work out the mass of wax, in kilograms, required to make 2500 of these candles.

**[7 marks]**

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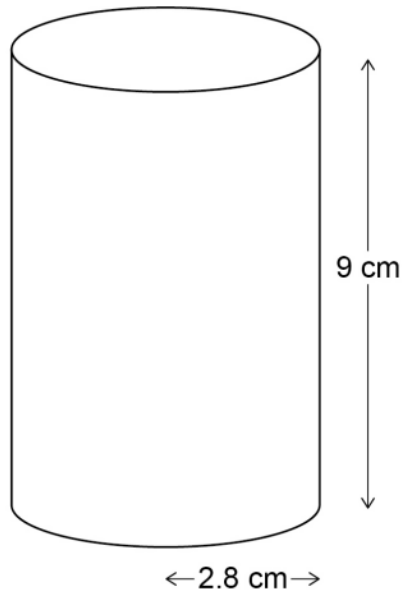
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Answer \_\_\_\_\_ kg

21.

A tin for carrots is a cylinder with radius 2.8 cm and height 9 cm



When filled, one sixth of the volume of the tin of carrots is water.  
The company uses 425 litres of water each day in tins of carrots.  
1 litre = 1000 cm<sup>3</sup>

How many tins of carrots does the company make each day?

**[5 marks]**

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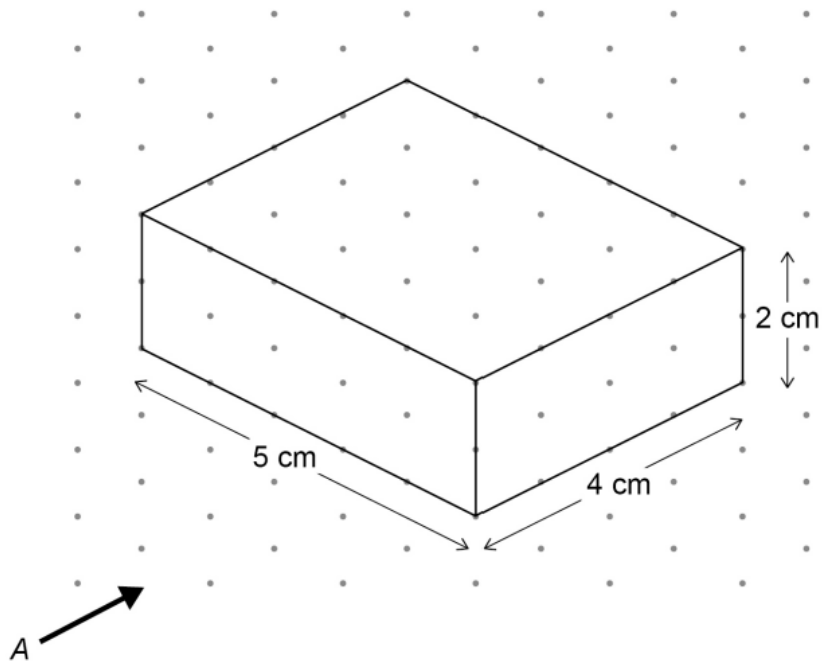
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Answer \_\_\_\_\_

22.

A cuboid is shown below.



Work out the total surface area of the cuboid.

**[3 marks]**

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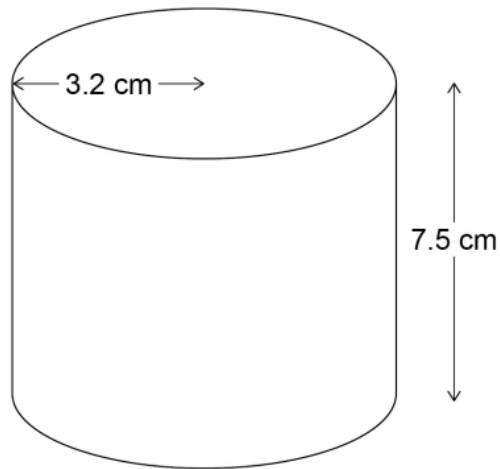
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Answer \_\_\_\_\_  $\text{cm}^2$

23.

A cylinder has radius 3.2 cm and height 7.5 cm



Work out the volume of the cylinder.

**[2 marks]**

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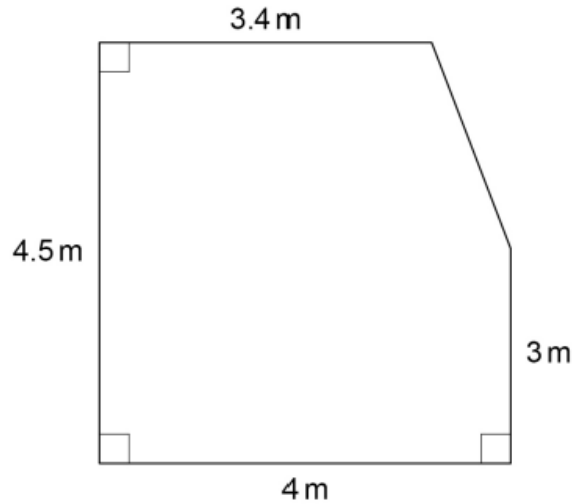
Answer \_\_\_\_\_  $\text{cm}^3$



24.

Molly is building a conservatory.

Here is a plan view of the conservatory.



Not drawn accurately

The conservatory floor will be made of concrete.

The concrete floor will be 0.1 m deep.

What volume of concrete will Molly need for the floor?

State the units of your answer.

**[6 marks]**

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Answer \_\_\_\_\_